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DISTRIBUTION OF PUBLIC EDUCATION FUNDING IN GEORGIA, 1992 : EQUITY FROM A NATIONAL PERSPECTIVE

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TABLE OF CONTENTS

I. Introduction 1

II. Concepts and Measures 2

III. Results 3

A. Comparison of Unadjusted and Adjusted Revenues 4
B. Horizontal Equity by Median Spending 6
C. Horizontal Equity by Region 8
D. Horizontal Equity by Number of Districts and Student Membership 10
E. Horizontal Equity Index 14

IV. Implications and Conclusions 18

References 22

Appendix 23

THE DISTRIBUTION OF PUBLIC EDUCATION FUNDING IN GEORGIA, 1992 EQUITY FROM A NATIONAL PERSPECTIVE

I. Introduction

For more than thirty years, researchers have examined the distribution of educational resources across school districts, typically focusing on cross-district comparisons within individual states (Berne, Moser, and Stiefel, 1998). In recent years, there has also been growing interest in cross-state comparisons of equity, emerging from national concerns for the fairness of the public education system. While the need for state-by-state data collection often hampered past efforts to measure the distribution of resources in all states, databases developed by the National Center for Education Statistics (NCES) have made it possible to examine equity from a national perspective.

This report analyzes the distribution of per-pupil funding in 49 states[1] for fiscal year 1992 -- the most recent year for which national data are available -- with close attention given to the distribution of resources in Georgia. The report presents the results of equity analyses using two types of data: nominal (unadjusted for cost-of-living differences) revenues from state and local sources, and revenues adjusted to reflect differences in the cost of education across districts. The results of the analyses provide a status report on equity in Georgia relative to the rest of the nation, and also provide further insight into the role of cost indices in the measurement of school finance equity (Rubenstein, Doering, Gess, 1998).

The report proceeds as follows: The next section defines the concept of "horizontal equity" and describes the measures used in this report. The third section uses unadjusted and adjusted data to compare the distribution of educational resources in Georgia to that in the 48

[1] Hawaii, with no local school districts, is excluded from the analysis.

other states. This section also examines whether state characteristics such as median spending, geographic location, and district size are related to the level of horizontal equity in a state. The final section discusses conclusions and implications, while an appendix contains a discussion of the data and its limitations.

II. Concepts and Measures

This paper uses measures developed by Berne and Stiefel to examine horizontal equity. Defined as the equal treatment of equals, horizontal equity examines the distribution of per-pupil resources across districts. Greater equality of per-pupil funding across districts indicates higher levels of horizontal equity.[2]

To quantify differences in per-pupil funding across districts for each state, the analyses use four univariate dispersion measures: the federal range ratio, the coefficient of variation, the Gini coefficient, and the McLoone index. Each of the measures focuses on different parts of the distribution of per-pupil funding. The *federal range ratio* is calculated by dividing the restricted range (the difference between the district at the 5th and 95th percentiles of per-pupil revenues) by the per-pupil revenues at the 5th percentile. The statistic focuses on only two observations but has the benefit of eliminating "outlier" districts (those with the highest and lowest per-pupil revenues). The *coefficient of variation* (the standard deviation divided by the mean) includes all districts, but it can be sensitive to outliers because it includes the mean of the distribution. The *Gini coefficient* is best depicted graphically and is defined as the ratio of the area between a 45

[2] These analyses do not take into account differences in student needs and characteristics. All students are implicitly assumed to require equal levels of funding. Districts in which over 50 percent of students are receiving special education services are removed from the analyses.

degree line and the Lorenz curve to the total area below the 45 degree line. The 45 degree line represents perfect equity, and the area between the 45 degree line and the Lorenz curve represents the amount of inequity. For the federal range ratio, coefficient of variation, and Gini coefficient, a value of zero indicates perfect equality, while higher values indicate greater inequality. The federal range ratio and the coefficient of variation have no maximum value while the Gini coefficient has a maximum value of 1. The *McLoone index* (the sum of per-pupil revenues for districts at or below the median divided by sum of per-pupil revenues if all districts below the median received the median amount) focuses on the distribution of funding to low-revenue districts. The McLoone index ranges from 0 to 1, with higher values representing higher levels of equity.

In addition to reporting the results of each measure for each state, we norm the measures relative to the national average for each measure. This process facilitates comparisons of the extent to which each state's results differ from each other and from the average. It also permits aggregation of the results into a single summary statistic for each state (discussed more fully below).

III. Results

Tables 1 through 5 present the results of the analyses, aggregated in a variety of ways. Each table includes measures calculated using both nominal and cost-adjusted data. In the tables, we also examine whether state characteristics such as median spending, geographic location, or number of school districts are related to the level of horizontal equity in a state.

A. Comparison of Unadjusted and Adjusted Revenues

When comparing the national averages of the dispersion measures, equity within states appears slightly greater on average when the data are adjusted for regional cost differences (Chambers, 1996 and McMahon, 1996) (see Table 1). The cost-adjusted federal range ratio, coefficient of variation, McLoone index, and Gini coefficient show a slightly more equitable distribution of revenues than do the unadjusted data. For example, the unadjusted federal range ratio (national average) suggests that districts at the 95th percentile receive 71 percent more state and local revenues per-pupil than districts at the 5th percentile, while the cost-adjusted measure shows a slightly smaller difference (69 percent). Similarly, the cost-adjusted Gini coefficient of 0.092 is below the unadjusted value of 0.094. While the effects of the adjustments vary across states, these patterns suggest that some resource disparities may reflect differences in the cost of providing education rather than an "unfair" distribution of revenue.

The values of the measures vary considerably across states. For example, the unadjusted federal range ratio varies from 0.286 in West Virginia to 1.795 in Missouri. Using the cost adjusted data the differences are also pronounced, ranging from 0.251 in West Virginia to 1.496 in Missouri, while the Gini coefficient ranges from 0.047 in West Virginia to 0.190 in Missouri.

In Georgia, the cost-adjusted data reflect a somewhat greater degree of equity across districts than do the unadjusted data. While the unadjusted and adjusted results for the McLoone index are virtually identical, the cost-adjusted federal range ratio, coefficient of variation, and Gini coefficient show substantially smaller disparities than do the unadjusted data. The unadjusted federal range ratio suggests that districts at the 95th percentile receive 96 percent more state and local revenues per-pupil than districts at the 5th percentile, while the cost-adjusted measures indicate that districts at the 95th percentile have 70 percent more revenue than those at

Table 1. Univariate Dispersion Measures: State and Local Revenues Per Pupil by Median Spending

	UNADJUSTED						ADJUSTED					
	State	Median Spending	Fed Range	Coefficient of Variation	McLoone Index	Gini Coefficient	State	Median Spending	Fed Range	Coefficient of Variation	McLoone Index	Gini Coefficient
< 25th Percentile	**Mean**	3,270	0.715	0.198	0.908	0.096	**Mean**	3,587	0.690	0.197	0.921	0.090
	Mississippi	2,690	0.530	0.141	0.928	0.077	Utah	3,099	0.361	0.165	0.962	0.069
	Alabama	2,836	0.752	0.187	0.911	0.090	Mississippi	3,159	0.444	0.132	0.927	0.072
	Utah	3,012	0.369	0.160	0.967	0.066	Alabama	3,201	0.630	0.161	0.926	0.077
	Idaho	3,100	0.466	0.145	0.936	0.081	Idaho	3,234	0.568	0.158	0.936	0.081
	Tennessee	3,130	0.830	0.209	0.826	0.117	Nevada	3,409	0.538	0.209	0.963	0.074
	Louisiana	3,194	0.469	0.134	0.877	0.074	Tennessee	3,424	0.735	0.188	0.844	0.104
	Arkansas	3,301	0.730	0.171	0.952	0.070	Missouri	3,654	1.496	0.434	0.858	0.190
	Missouri	3,421	1.795	0.462	0.836	0.213	Arkansas	3,839	0.661	0.168	0.934	0.073
	Nevada	3,464	0.670	0.207	0.941	0.080	California	3,933	0.638	0.191	0.898	0.085
	Kentucy	3,609	0.333	0.098	0.951	0.054	New Mexico	3,958	0.665	0.169	0.940	0.065
	South Dakota	3,687	0.697	0.206	0.885	0.103	Illinois	4,069	1.250	0.296	0.926	0.134
	Oklahoma	3,793	0.941	0.254	0.886	0.125	Kentucy	4,070	0.292	0.089	0.933	0.050
25th-50th Percentile	**Mean**	4,220	0.707	0.193	0.914	0.093	**Mean**	4,490	0.764	0.210	0.900	0.100
	New Mexico	3,821	0.570	0.144	0.919	0.061	South Dakota	4,189	0.803	0.235	0.873	0.116
	North Dakota	3,935	0.795	0.210	0.893	0.102	Montana	4,261	1.390	0.379	0.928	0.171
	Georgia	**3,998**	**0.969**	**0.220**	**0.898**	**0.120**	Ohio	4,380	1.230	0.311	0.870	0.123
	South Carolina	4,007	0.486	0.122	0.932	0.067	North Dakota	4,415	1.148	0.261	0.867	0.127
	Montana	4,019	1.147	0.355	0.917	0.161	Arizona	4,442	0.799	0.190	0.909	0.093
	Texas	4,236	0.361	0.144	0.944	0.062	**Georgia**	**4,451**	**0.701**	**0.192**	**0.896**	**0.102**
	Virginia	4,263	0.820	0.244	0.904	0.130	Virginia	4,461	0.695	0.179	0.902	0.096
	North Carolina	4,305	0.495	0.137	0.914	0.075	South Carolina	4,498	0.400	0.108	0.917	0.059
	Arizona	4,331	0.716	0.196	0.918	0.093	Texas	4,510	0.622	0.188	0.920	0.080
	California	4,399	0.564	0.180	0.919	0.083	Louisiana	4,596	0.498	0.128	0.875	0.069
	Ohio	4,439	1.464	0.320	0.844	0.137	North Carolina	4,600	0.392	0.116	0.933	0.062
	West Virginia	4,478	0.286	0.091	0.949	0.047	Colorado	4,767	0.324	0.184	0.958	0.071
	Indiana	4,635	0.525	0.149	0.927	0.077	Oklahoma	4,799	0.933	0.260	0.853	0.132
50th-75th Percentile	**Mean**	5,044	0.739	0.190	0.898	0.096	**Mean**	4,982	0.625	0.167	0.919	0.084
	Illinois	4,701	1.646	0.362	0.794	0.172	Mass	4,811	0.816	0.226	0.892	0.109
	Colorado	4,744	0.497	0.171	0.952	0.077	Maine	4,820	0.637	0.199	0.911	0.098
	Iowa	4,773	0.352	0.113	0.941	0.054	Indiana	4,841	0.448	0.140	0.922	0.070
	Kansas	4,845	0.755	0.176	0.881	0.089	Oregon	4,871	0.613	0.174	0.910	0.091
	Oregon	4,913	0.680	0.174	0.894	0.095	Michigan	4,886	0.838	0.197	0.911	0.103
	Maine	4,969	0.591	0.187	0.923	0.094	Washington	4,910	0.395	0.148	0.931	0.063
	Nebraska	5,153	0.760	0.180	0.880	0.092	New Hamp	4,939	0.976	0.225	0.909	0.116
	Michigan	5,160	1.035	0.236	0.863	0.126	Maryland	4,970	0.561	0.138	0.906	0.078
	Maryland	5,165	0.602	0.162	0.918	0.087	West Virginia	5,078	0.251	0.093	0.954	0.047
	Washington	5,280	0.429	0.136	0.902	0.070	Delaware	5,185	0.645	0.106	0.945	0.057
	Minnesota	5,382	0.590	0.167	0.923	0.088	Kansas	5,234	0.856	0.219	0.897	0.108
	New Hamp	5,438	0.930	0.218	0.909	0.112	Iowa	5,244	0.464	0.140	0.941	0.067
>75th Percentile	**Mean**	6,486	0.686	0.185	0.905	0.092	**Mean**	6,139	0.684	0.189	0.909	0.092
	Wyoming	5,559	0.637	0.266	0.912	0.105	Rhode Island	5,278	0.413	0.123	0.920	0.065
	Delaware	5,632	0.617	0.115	0.898	0.064	Pennsylvania	5,445	0.602	0.150	0.937	0.078
	Mass	5,632	0.836	0.231	0.877	0.115	Minnesota	5,539	0.476	0.160	0.922	0.077
	Florida	5,660	0.407	0.107	0.900	0.059	Florida	5,615	0.292	0.095	0.943	0.049
	Wisconsin	5,770	0.453	0.124	0.923	0.066	Nebraska	5,635	0.853	0.226	0.887	0.110
	Pennsylvania	5,923	0.730	0.180	0.901	0.095	Wisconsin	5,867	0.415	0.114	0.942	0.058
	Rhode Island	5,981	0.412	0.116	0.914	0.059	Alaska	5,932	0.831	0.229	0.989	0.093
	Alaska	6,836	0.760	0.216	0.960	0.097	Wyoming	5,997	0.710	0.272	0.931	0.106
	New York	6,960	0.840	0.256	0.930	0.121	Connecticut	6,601	0.592	0.169	0.925	0.080
	Vermont	7,173	1.197	0.266	0.835	0.144	New York	6,701	1.058	0.278	0.788	0.148
	Connecticut	7,716	0.586	0.164	0.921	0.079	Vermont	7,321	1.250	0.268	0.830	0.146
	New Jersey	8,993	0.756	0.182	0.886	0.097	New Jersey	7,735	0.715	0.182	0.899	0.097
	Avg for all states	4,744	0.712	0.192	0.906	0.094	Avg for all states	4,793	0.692	0.191	0.912	0.092

the 5th. The coefficient of variation and the Gini coefficient also decrease when cost adjustments are incorporated, suggesting a more equal distribution of revenues.

While there are no general standards for equity against which to judge these measures, Odden and Picus (1992) offer suggested benchmarks of 0.10 or lower for the coefficient of variation and the Gini coefficient, and 0.90 or higher for the McLoone index, as representing "acceptable" levels of equity. Nationally, the means of both the McLoone index and Gini coefficient achieve these benchmarks, but the mean coefficient of variation does not. In Georgia, while the cost-adjusted data indicate greater equity than do the unadjusted data (with the exception of the McLoone index), none of the measures meet the suggested benchmarks for "acceptable" revenue disparities.

B. Horizontal Equity by Median Spending

Table 1 displays the equity measures by quartile of median per-pupil spending. Using unadjusted data, average median spending for states in the lowest quartile is only 69 percent of the national average ($3,270 vs. $4,744), while median spending for the states in the top quartile is 37 percent more than the national average ($6,486 vs. $4,744). Median spending in the lowest quartile averages half that in the upper quartile. When adjustments are made for regional cost differences the differences are substantially smaller. Median spending for the states in the lowest quartile increases to 75 percent of the national average ($3,587 vs. $4,793), while for states in the top quartile spending declines to 28 percent above the national average ($6,139 vs. $4,793). Median adjusted spending in the lowest quartile averages 58 percent of that in the upper quartile. Thus, cost of education differences across states drive a portion of the interstate differences in resource levels, with high-cost states tending to have higher revenues per-pupil.

Further inspection of the unadjusted data reveals that the Southern states (with some exceptions, such as Florida) tend to be in the lowest quartile of per-pupil spending while Northeastern states tend to be in the highest quartile. While the unadjusted federal range ratio suggests slightly lower disparities in low-spending states, the other equity measures show mixed results as median spending per pupil increases, with no clear relationship between spending levels and equity. This result is somewhat surprising given the results discussed below (see *Horizontal Equity by Region*) which show fewer disparities in Southern states, which are over-represented in the low-spending group. The results using the cost-adjusted data are also mixed, with the most equitable distributions found, on average in the first quartile (below the 25th percentile) and third quartile (50th to 75th percentile) of spending.

Comparing the results of the unadjusted and adjusted analyses, again no clear pattern emerges. For the lowest-spending states, the cost adjustments tend to make the distribution appear slightly more equitable, indicating that lower-spending districts in those states may have lower associated costs. The pattern is less clear for the other quartiles, however. The lack of a consistent pattern is most likely due to the variation across states in the effects of the cost adjustments, and the fact that a number of states change quartiles when the cost-adjusted data are used.

The state of Georgia is located in the second quartile (between the 25th and 50th percentiles of per-pupil spending) for both unadjusted and adjusted data. As previously described, Georgia's cost-adjusted data show a greater degree of equity than do the unadjusted measures, even though Georgia's funding formula, the Quality Basic Education program (QBE), makes no adjustment for differential costs across districts. This suggests that the higher cost districts in Georgia (which are primarily located in metropolitan Atlanta) tend to also have the

highest revenues. In 1992, the twelve districts with the highest cost of education indices (all located in metropolitan Atlanta) faced average costs approximately 15 percent higher than the state average, and these districts also had revenue levels above the state average. Therefore, a portion of the additional revenue available to these districts merely compensates for the higher costs these districts face. Adjusting the data to reflect these differential costs lowers the observed disparities across districts.

C. Horizontal Equity by Region

As shown in Table 2, states in the Midwest and Northeast appear to have a less equitable distribution of revenues than do states in the South or West. These results are not sensitive to the choice of unadjusted or adjusted data. For example, the average unadjusted Gini coefficient is 34 percent higher for Midwestern states than for Southern states (0.110 vs. 0.082), with a slightly larger difference in the adjusted measures (0.107 vs. 0.076). On average, all measures indicate that Southern states tend to have a more equal distribution of resources than states in other regions. The cost-adjusted Gini coefficient for each Southern state (with the exception of Oklahoma) is below the average for the Midwestern states. It is important to note again, however, that Southern states traditionally have lower spending levels for education than states in other regions, particularly the Northeast.

While Southern states tend to have more equal distributions of resources than states in other regions, the measures indicate that Georgia has a less equitable distribution than other Southern states, with the exception of Oklahoma and Tennessee. When compared to other Southern states, Georgia ranks no better than third from the bottom on any of the equity measures (using both adjusted and unadjusted data).

Table 2. Univariate Dispersion Measures: State and Local Revenues Per Pupil by Region

State	Fed Range Unadjusted	Fed Range Adjusted	Coefficent of Variation Unadjusted	Coefficent of Variation Adjusted	McLoone Index Unadjusted	McLoone Index Adjusted	Gini Coefficient Unadjusted	Gini Coefficient Adjusted
Midwest Mean	0.906	0.773	0.225	0.228	0.882	0.901	0.110	0.107
Illinois	1.646	1.250	0.362	0.296	0.794	0.926	0.172	0.134
Indiana	0.525	0.448	0.149	0.140	0.927	0.922	0.077	0.070
Iowa	0.352	0.464	0.113	0.140	0.941	0.941	0.054	0.067
Kansas	0.755	0.856	0.176	0.219	0.881	0.897	0.089	0.108
Michigan	1.035	0.838	0.236	0.197	0.863	0.911	0.126	0.103
Minnesota	0.590	0.476	0.167	0.160	0.923	0.922	0.088	0.077
Missouri	1.795	0.496	0.462	0.434	0.836	0.858	0.213	0.190
Nebraska	0.760	0.853	0.180	0.226	0.880	0.887	0.092	0.110
North Dakota	0.795	1.148	0.210	0.261	0.893	0.867	0.102	0.127
Ohio	1.464	1.230	0.320	0.311	0.844	0.870	0.137	0.123
South Dakota	0.697	0.803	0.206	0.235	0.885	0.873	0.103	0.116
Wisconsin	0.453	0.415	0.124	0.114	0.923	0.942	0.066	0.058
Northeast Mean	0.764	0.784	0.200	0.202	0.900	0.890	0.102	0.104
Connecticut	0.586	0.592	0.164	0.169	0.921	0.925	0.079	0.080
Maine	0.591	0.637	0.187	0.199	0.923	0.911	0.094	0.098
Mass	0.836	0.816	0.231	0.226	0.877	0.892	0.115	0.109
New Hamp	0.930	0.976	0.218	0.225	0.909	0.909	0.112	0.116
New Jersey	0.756	0.715	0.182	0.182	0.886	0.899	0.097	0.097
New York	0.840	1.058	0.256	0.278	0.930	0.788	0.121	0.148
Pennsylvania	0.730	0.602	0.180	0.150	0.901	0.937	0.095	0.078
Rhode Island	0.412	0.413	0.116	0.123	0.914	0.920	0.059	0.065
Vermont	1.197	1.250	0.266	0.268	0.835	0.830	0.144	0.146
South Mean	0.602	0.547	0.159	0.146	0.912	0.913	0.082	0.076
Alabama	0.752	0.630	0.187	0.161	0.911	0.926	0.090	0.077
Arkansas	0.730	0.661	0.171	0.168	0.952	0.934	0.070	0.073
Delaware	0.617	0.645	0.115	0.106	0.898	0.945	0.064	0.057
Florida	0.407	0.292	0.107	0.095	0.900	0.943	0.059	0.049
Georgia	**0.969**	**0.701**	**0.220**	**0.192**	**0.898**	**0.896**	**0.120**	**0.102**
Kentucy	0.333	0.292	0.098	0.089	0.951	0.933	0.054	0.050
Louisiana	0.469	0.498	0.134	0.128	0.877	0.875	0.074	0.069
Maryland	0.602	0.561	0.162	0.138	0.918	0.906	0.087	0.078
Mississippi	0.530	0.444	0.141	0.132	0.928	0.927	0.077	0.072
North Carolina	0.495	0.392	0.137	0.116	0.914	0.933	0.075	0.062
Oklahoma	0.941	0.933	0.254	0.260	0.886	0.853	0.125	0.132
South Carolina	0.486	0.400	0.122	0.108	0.932	0.917	0.067	0.059
Tennessee	0.830	0.735	0.209	0.188	0.826	0.844	0.117	0.104
Texas	0.361	0.622	0.144	0.188	0.944	0.920	0.062	0.080
Virginia	0.820	0.695	0.244	0.179	0.904	0.902	0.130	0.096
West Virginia	0.286	0.251	0.091	0.093	0.949	0.954	0.047	0.047
West Mean	0.625	0.653	0.196	0.206	0.928	0.938	0.089	0.088
Alaska	0.760	0.831	0.216	0.229	0.960	0.989	0.097	0.093
Arizona	0.716	0.799	0.196	0.190	0.918	0.909	0.093	0.088
California	0.564	0.638	0.180	0.191	0.919	0.898	0.083	0.085
Colorado	0.497	0.324	0.171	0.184	0.952	0.958	0.077	0.071
Idaho	0.466	0.568	0.145	0.158	0.936	0.936	0.081	0.081
Montana	1.147	1.390	0.355	0.379	0.917	0.928	0.161	0.171
Nevada	0.670	0.538	0.207	0.209	0.941	0.963	0.080	0.074
New Mexico	0.570	0.665	0.144	0.169	0.919	0.940	0.061	0.065
Oregon	0.680	0.613	0.174	0.174	0.894	0.910	0.095	0.091
Utah	0.369	0.361	0.160	0.165	0.967	0.962	0.066	0.069
Washington	0.429	0.395	0.136	0.148	0.902	0.931	0.070	0.063
Wyoming	0.637	0.710	0.266	0.272	0.912	0.931	0.105	0.106
Avg for all states	0.712	0.692	0.192	0.191	0.906	0.912	0.094	0.092

D. Horizontal Equity by Number of Districts and Student Membership

Tables 3 and 4 present the results of the analyses by state size. In Table 3 size is measured as the number of school districts per state, and in Table 4 as the total number of pupils per state. The measures in Table 3 suggest that disparities in school district revenues increase as the number of school districts in a state increases. This pattern is not unexpected. As the number of districts increases, particularly if the average size of districts also declines, one is likely to find greater heterogeneity across localities (Oates, 1972).[3] These inter-district differences are likely to affect districts' ability to raise revenues for education. Conversely, states with fewer districts may tend to be more homogeneous across districts and, therefore, display smaller revenue disparities. Additionally, many of the states with a large number of districts (for example, California, Illinois, and New York) have one or two very large urban areas that exert a large influence on the measures.[4]

The results in Table 4 differ slightly from those in Table 3. Looking at the unadjusted measures broken out by student membership, we see that, on average, there are greater revenue disparities in states below the 25th percentile (fewer than 250,585 pupils) and above the 75th percentile (more than 982,537 pupils) for the federal range ratio, coefficient of variation and Gini coefficient. Among the smaller states, Vermont and Montana have particularly inequitable distributions of revenue, while Illinois, New York, and Ohio have fairly inequitable distributions

[3] Oates (1972) indicates public goods will be provided by jurisdictions that cover the smallest geographic area over which benefits are distributed so that efficiencies are maximized and the effects of taste differences are minimized.
[4] The measures are weighted by the number of pupils in each state. Therefore, very large districts can represent a large percentage of the observations within a state and exert a strong influence on the results.

Table 3. Univariate Dispersion Measures: State and Local Revenues Per Pupil by Number of School Districts

		Fed Range Unadjusted	Fed Range Adjusted	Coefficient of Variation Unadjusted	Coefficient of Variation Adjusted	McLoone Unadjusted	McLoone Adjusted	Gini Coefficient Unadjusted	Gini Coefficient Adjusted
< 25th	**Mean**	0.524	0.514	0.153	0.153	0.924	0.937	0.072	0.069
percentile	Alaska	0.760	0.831	0.216	0.229	0.960	0.989	0.097	0.093
< 100 districts	Delaware	0.617	0.645	0.115	0.106	0.898	0.945	0.064	0.057
	Florida	0.407	0.292	0.107	0.095	0.900	0.943	0.059	0.049
	Louisiana	0.469	0.498	0.134	0.128	0.877	0.875	0.074	0.069
	Maryland	0.602	0.561	0.162	0.138	0.918	0.906	0.087	0.078
	Nevada	0.670	0.538	0.207	0.209	0.941	0.963	0.080	0.074
	New Mexico	0.570	0.665	0.144	0.169	0.919	0.940	0.061	0.065
	Rhode Island	0.412	0.413	0.116	0.123	0.914	0.920	0.059	0.065
	South Carolina	0.486	0.400	0.122	0.108	0.932	0.917	0.067	0.059
	Utah	0.369	0.361	0.160	0.165	0.967	0.962	0.066	0.069
	West Virginia	0.286	0.251	0.091	0.093	0.949	0.954	0.047	0.047
	Wyoming	0.637	0.710	0.266	0.272	0.912	0.931	0.105	0.106
25th- 49th	**Mean**	0.663	0.612	0.180	0.171	0.912	0.913	0.093	0.086
percentile	Alabama	0.752	0.630	0.187	0.161	0.911	0.926	0.090	0.077
100 - 204	Arizona	0.716	0.799	0.196	0.190	0.918	0.909	0.093	0.093
	Colorado	0.497	0.324	0.171	0.184	0.952	0.958	0.077	0.071
	Connecticut	0.586	0.592	0.164	0.169	0.921	0.925	0.079	0.080
	Georgia	**0.969**	**0.701**	**0.220**	**0.192**	**0.898**	**0.896**	**0.120**	**0.102**
	Idaho	0.466	0.568	0.145	0.158	0.936	0.936	0.081	0.081
	Kentucy	0.333	0.292	0.098	0.089	0.951	0.933	0.054	0.050
	Mississippi	0.530	0.444	0.141	0.132	0.928	0.927	0.077	0.072
	New Hamp	0.930	0.976	0.218	0.225	0.909	0.909	0.112	0.116
	North Carolina	0.495	0.392	0.137	0.116	0.914	0.933	0.075	0.062
	South Dakota	0.697	0.803	0.206	0.235	0.885	0.873	0.103	0.116
	Tennessee	0.830	0.735	0.209	0.188	0.826	0.844	0.117	0.104
	Virginia	0.820	0.695	0.244	0.179	0.904	0.902	0.130	0.096
50th-74th	**Mean**	0.661	0.682	0.175	0.185	0.906	0.908	0.089	0.091
percentile	Arkansas	0.730	0.661	0.171	0.168	0.952	0.934	0.070	0.073
205-460	Indiana	0.525	0.448	0.149	0.140	0.927	0.922	0.077	0.070
	Iowa	0.352	0.464	0.113	0.140	0.941	0.941	0.054	0.067
	Kansas	0.755	0.856	0.176	0.219	0.881	0.897	0.089	0.108
	Maine	0.591	0.637	0.187	0.199	0.923	0.911	0.094	0.098
	Mass	0.836	0.816	0.231	0.226	0.877	0.892	0.115	0.109
	Minnesota	0.590	0.476	0.167	0.160	0.923	0.922	0.088	0.077
	North Dakota	0.795	1.148	0.210	0.261	0.893	0.867	0.102	0.127
	Oregon	0.680	0.613	0.174	0.174	0.894	0.910	0.095	0.091
	Vermont	1.197	1.250	0.266	0.268	0.835	0.830	0.144	0.146
	Washington	0.429	0.395	0.136	0.148	0.902	0.931	0.070	0.063
	Wisconsin	0.453	0.415	0.124	0.114	0.923	0.942	0.066	0.058
> 75th	**Mean**	1.003	0.969	0.259	0.258	0.883	0.890	0.124	0.121
percentile	California	0.564	0.638	0.180	0.191	0.919	0.898	0.083	0.085
> 461 districts	Illinois	1.646	1.250	0.362	0.296	0.794	0.926	0.172	0.134
	Michigan	1.035	0.838	0.236	0.197	0.863	0.911	0.126	0.103
	Missouri	1.795	1.496	0.462	0.434	0.836	0.858	0.213	0.190
	Montana	1.147	1.390	0.355	0.379	0.917	0.928	0.161	0.171
	Nebraska	0.760	0.853	0.180	0.226	0.880	0.887	0.092	0.110
	New Jersey	0.756	0.715	0.182	0.182	0.886	0.899	0.097	0.097
	New York	0.840	1.058	0.256	0.278	0.930	0.788	0.121	0.148
	Ohio	1.464	1.230	0.320	0.311	0.844	0.870	0.137	0.123
	Oklahoma	0.941	0.933	0.254	0.260	0.886	0.853	0.125	0.132
	Pennsylvania	0.730	0.602	0.180	0.150	0.901	0.937	0.095	0.078
	Texas	0.361	0.622	0.144	0.188	0.944	0.920	0.062	0.080
	Avg for all states	0.712	0.692	0.192	0.191	0.906	0.912	0.094	0.092

Table 4. Univariate Dispersion Measures: State and Local Revenues Per Pupil by Number of Students

		Fed Range Unadjusted	Fed Range Adjusted	Coefficient of Variation Unadjusted	Coefficient of Variation Adjusted	McLoone Unadjusted	McLoone Adjusted	Gini Coefficient Unadjusted	Gini Coefficient Adjusted
< 25th	**Mean**	0.743	0.826	0.209	0.222	0.910	0.917	0.100	0.104
percentile	Alaska	0.760	0.831	0.216	0.229	0.960	0.989	0.097	0.093
< 250,586	Delaware	0.617	0.645	0.115	0.106	0.898	0.945	0.064	0.057
	Idaho	0.466	0.568	0.145	0.158	0.936	0.936	0.081	0.081
	Maine	0.591	0.637	0.187	0.199	0.923	0.911	0.094	0.098
	Montana	1.147	1.390	0.355	0.379	0.917	0.928	0.161	0.171
	Nevada	0.670	0.538	0.207	0.209	0.941	0.963	0.080	0.074
	New Hamp	0.930	0.976	0.218	0.225	0.909	0.909	0.112	0.116
	North Dakota	0.795	1.148	0.210	0.261	0.893	0.867	0.102	0.127
	Rhode Island	0.412	0.413	0.116	0.123	0.914	0.920	0.059	0.065
	South Dakota	0.697	0.803	0.206	0.235	0.885	0.873	0.103	0.116
	Vermont	1.197	1.250	0.266	0.268	0.835	0.830	0.144	0.146
	Wyoming	0.637	0.710	0.266	0.272	0.912	0.931	0.105	0.106
25th - 49th	**Mean**	0.580	0.571	0.159	0.170	0.923	0.924	0.077	0.080
percentile	Arkansas	0.730	0.661	0.171	0.168	0.952	0.934	0.070	0.073
250,586 -	Colorado	0.497	0.324	0.171	0.184	0.952	0.958	0.077	0.071
625,838	Connecticut	0.586	0.592	0.164	0.169	0.921	0.925	0.079	0.080
	Iowa	0.352	0.464	0.113	0.140	0.941	0.941	0.054	0.067
	Kansas	0.755	0.856	0.176	0.219	0.881	0.897	0.089	0.108
	Mississippi	0.530	0.444	0.141	0.132	0.928	0.927	0.077	0.072
	Nebraska	0.760	0.853	0.180	0.226	0.880	0.887	0.092	0.110
	New Mexico	0.570	0.665	0.144	0.169	0.919	0.940	0.061	0.065
	Oklahoma	0.941	0.933	0.254	0.260	0.886	0.853	0.125	0.132
	Oregon	0.680	0.613	0.174	0.174	0.894	0.910	0.095	0.091
	South Carolina	0.486	0.400	0.122	0.108	0.932	0.917	0.067	0.059
	Utah	0.369	0.361	0.160	0.165	0.967	0.962	0.066	0.069
	West Virginia	0.286	0.251	0.091	0.093	0.949	0.954	0.047	0.047
50th - 74th	**Mean**	0.694	0.630	0.188	0.176	0.899	0.905	0.095	0.087
percentile	Alabama	0.752	0.630	0.187	0.161	0.911	0.926	0.090	0.077
625,839 -	Arizona	0.716	0.799	0.196	0.190	0.918	0.909	0.093	0.093
982,537	Indiana	0.525	0.448	0.149	0.140	0.927	0.922	0.077	0.070
	Kentucy	0.333	0.292	0.098	0.089	0.951	0.933	0.054	0.050
	Louisiana	0.469	0.498	0.134	0.128	0.877	0.875	0.074	0.069
	Maryland	0.602	0.561	0.162	0.138	0.918	0.906	0.087	0.078
	Mass	0.836	0.816	0.231	0.226	0.877	0.892	0.115	0.109
	Minnesota	0.590	0.476	0.167	0.160	0.923	0.922	0.088	0.077
	Missouri	1.795	1.496	0.462	0.434	0.836	0.858	0.213	0.190
	Tennessee	0.830	0.735	0.209	0.188	0.826	0.844	0.117	0.104
	Washington	0.429	0.395	0.136	0.148	0.902	0.931	0.070	0.063
	Wisconsin	0.453	0.415	0.124	0.114	0.923	0.942	0.066	0.058
75th quartile	**Mean**	0.841	0.753	0.214	0.198	0.891	0.902	0.106	0.096
and above	California	0.564	0.638	0.180	0.191	0.919	0.898	0.083	0.085
< 982,538	Florida	0.407	0.292	0.107	0.095	0.900	0.943	0.059	0.049
	Georgia	**0.969**	**0.701**	**0.220**	**0.192**	**0.898**	**0.896**	**0.120**	**0.102**
	Illinois	1.646	1.250	0.362	0.296	0.794	0.926	0.172	0.134
	Michigan	1.035	0.838	0.236	0.197	0.863	0.911	0.126	0.103
	New Jersey	0.756	0.715	0.182	0.182	0.886	0.899	0.097	0.097
	New York	0.840	1.058	0.256	0.278	0.930	0.788	0.121	0.148
	North Carolina	0.495	0.392	0.137	0.116	0.914	0.933	0.075	0.062
	Ohio	1.464	1.230	0.320	0.311	0.844	0.870	0.137	0.123
	Pennsylvania	0.730	0.602	0.180	0.150	0.901	0.937	0.095	0.078
	Texas	0.361	0.622	0.144	0.188	0.944	0.920	0.062	0.080
	Virginia	0.820	0.695	0.244	0.179	0.904	0.902	0.130	0.096
	Avg for all states	0.712	0.692	0.192	0.191	0.906	0.912	0.094	0.092

among the larger states.[5] The results are similar when the data are adjusted for geographic cost differences.

Two-tailed Pearson correlation coefficients show a fairly strong relationship between most of the equity measures and the number of districts in a state. For example, the coefficient of variation and federal range ratio display correlation coefficients of 0.426 and 0.460 respectively ($p < .01$) with the number of districts, while the McLoone index has a correlation coefficient of -0.329 ($p < .05$). Each of these results indicates that equity declines as the number of districts increases. No significant relationship exists with student membership, however. The results from this analysis suggest that states with a larger number of school districts tend to have greater inequities in funding across those districts, although total state enrollment may have little impact on the distribution of resources.

Georgia, however, is one state that diverges from this pattern. When compared to other states with between 100 and 204 districts, the distribution of revenues in Georgia is among the most unequal. Even when compared to districts with 205 to 460 school districts (3rd quartile), all of the measures indicate that the distribution of resources in Georgia is less equitable than most of the states with slightly more districts. This is contrary to the finding that equity tends to improve as the number of districts declines.

Examining the number of pupils per state, Georgia, with over 1 million students, ranks in the highest quartile nationally. Compared to other large states, Georgia again appears to be among the least equitable. For example, using the cost–adjusted data, only Illinois, Michigan, New York, and Ohio have higher (less equitable) Gini coefficients than Georgia does, while only

[5] Note that the data used are from 1991-92. Many of the states in which the greatest inequities are apparent, including Illinois, Massachusetts, Missouri, New Hampshire, Ohio, Texas, and Vermont have implemented significant changes in state education funding programs since that time.

New York and Ohio have lower (less equitable) values for the McLoone index. Thus, the distribution of revenues in Georgia is less equitable than most other comparably sized states.

E. Horizontal Equity Index

The multitude of measures available to assess horizontal equity can be both a strength and weakness of the analysis. The measures allow researchers and policy makers to take a broad view of resource distribution and to avoid problems that may arise from reliance on a single, possibly misleading, statistic. As the preceding discussions may demonstrate, however, the array of measures can also complicate the analysis, making the results difficult to summarize. The problem is exacerbated when numerous objects of analysis are used, such as multiple revenue or expenditure variables, or cost-adjusted and nominal data. To address this issue, we construct indexed values for four dispersion measures (federal range ratio, coefficient of variation, McLoone index and Gini coefficient). Each measure for each state is set relative to the unweighted mean value for all states (Table 5).[6] Thus, Georgia's indexed coefficient of variation (unadjusted) of 1.15 indicates that Georgia's coefficient of variation is 15% higher than the national mean. A single summary statistic is then calculated for each state by taking the average of the four indices.[7] All indices are constructed so that higher values indicate less equitable

[6] While the statistics for each state are weighted by the number of pupils in each district, the national average is constructed as the simple (unweighted) mean of each state's values (n=49).

[7] The summary statistic offers a "*snapshot*" of equity across the states, but must be analyzed with the individual raw and normed measures. The summary statistic, for example, gives equal weight to each dispersion measure. All results are displayed in tables to allow the reader to judge the relative importance of each measure. Additionally, the norming procedure sets each state's results relative to the national average, not a predetermined "benchmark" for acceptable equity.

Table 5. Indexed Univariate Dispersion Measures by State

Rank	State	Fed Range Ratio	Coefficient of Variation	Gini Coefficient	Mcloone Index	Mean Index
	INDEX-UNADJUSTED DATA					
1	West Virginia	0.402	0.475	0.499	0.544	0.480
2	Kentucky	0.468	0.511	0.568	0.527	0.519
3	Iowa	0.494	0.588	0.576	0.630	0.572
4	Utah	0.518	0.837	0.700	0.352	0.602
5	Texas	0.507	0.751	0.658	0.598	0.628
6	Rhode Island	0.579	0.606	0.630	0.918	0.683
7	South Carolina	0.683	0.638	0.711	0.726	0.689
8	Wisconsin	0.636	0.648	0.700	0.822	0.702
9	Florida	0.572	0.558	0.626	1.066	0.705
10	Colorado	0.698	0.893	0.821	0.515	0.732
11	Idaho	0.655	0.755	0.855	0.682	0.737
12	New Mexico	0.801	0.753	0.647	0.865	0.766
13	Mississippi	0.745	0.735	0.817	0.772	0.767
14	Washington	0.603	0.712	0.737	1.046	0.774
15	Indiana	0.737	0.779	0.815	0.779	0.777
16	North Carolina	0.695	0.715	0.790	0.918	0.780
17	Arkansas	1.025	0.894	0.743	0.512	0.794
18	Delaware	0.867	0.602	0.676	1.094	0.810
19	Connecticut	0.823	0.855	0.840	0.844	0.841
20	Louisiana	0.658	0.701	0.780	1.312	0.863
21	Minnesota	0.829	0.873	0.928	0.825	0.864
22	California	0.792	0.939	0.877	0.860	0.867
23	Maryland	0.846	0.844	0.923	0.871	0.871
24	Nevada	0.941	1.079	0.849	0.630	0.875
25	Maine	0.830	0.974	0.998	0.824	0.907
26	Alaska	1.067	1.127	1.027	0.428	0.912
27	Arizona	1.005	1.020	0.982	0.877	0.971
28	Alabama	1.056	0.973	0.957	0.953	0.985
	Avg for all states	1.000	1.000	1.000	1.000	1.000
29	Oregon	0.955	0.908	1.006	1.131	1.000
30	Pennsylvania	1.026	0.937	1.008	1.057	1.007
31	Kansas	1.061	0.921	0.947	1.273	1.050
32	New Jersey	1.062	0.948	1.029	1.217	1.064
33	Nebraska	1.068	0.939	0.976	1.281	1.066
34	Wyoming	0.895	1.388	1.114	0.939	1.084
35	South Dakota	0.979	1.075	1.093	1.228	1.094
36	North Dakota	1.117	1.094	1.062	1.142	1.109
37	New York	1.180	1.337	1.264	0.747	1.137
38	New Hamp	1.307	1.137	1.188	0.971	1.151
39	Virginia	1.152	1.272	1.379	1.025	1.207
40	**Georgia**	**1.361**	**1.149**	**1.272**	**1.089**	**1.218**
41	Mass	1.175	1.208	1.221	1.312	1.229
42	Oklahoma	1.322	1.328	1.326	1.217	1.298
43	Tennessee	1.166	1.088	1.241	1.857	1.338
44	Michigan	1.454	1.230	1.334	1.466	1.371
45	Montana	1.612	1.850	1.708	0.886	1.514
46	Vermont	1.682	1.386	1.527	1.761	1.589
47	Ohio	2.057	1.670	1.453	1.665	1.711
48	Illinois	2.313	1.888	1.828	2.195	2.056
49	Missouri	2.521	2.413	2.256	1.748	2.235

Rank	State	Fed Range Ratio	Coefficient of Variation	McLoone Index	Gini Coefficient	Mean Index
	INDEX-ADJUSTED DATA					
1	West Virginia	0.360	0.489	0.523	0.513	0.471
2	Florida	0.417	0.499	0.649	0.530	0.524
3	Kentucky	0.418	0.466	0.765	0.548	0.549
4	Wisconsin	0.595	0.597	0.659	0.633	0.621
5	Utah	0.518	0.864	0.432	0.757	0.643
6	North Carolina	0.562	0.605	0.762	0.680	0.652
7	Colorado	0.463	0.961	0.477	0.773	0.669
8	Delaware	0.922	0.556	0.631	0.620	0.682
9	South Carolina	0.574	0.566	0.943	0.647	0.683
10	Iowa	0.664	0.733	0.667	0.727	0.698
11	Washington	0.566	0.776	0.784	0.692	0.705
12	Rhode Island	0.592	0.644	0.909	0.709	0.714
13	Mississippi	0.635	0.691	0.829	0.791	0.737
14	Indiana	0.641	0.730	0.892	0.759	0.755
15	Nevada	0.769	1.093	0.421	0.808	0.773
16	Pennsylvania	0.863	0.785	0.716	0.851	0.804
17	New Mexico	0.954	0.885	0.682	0.712	0.808
18	Idaho	0.812	0.829	0.727	0.880	0.812
19	Minnesota	0.680	0.837	0.887	0.844	0.812
20	Arkansas	0.945	0.877	0.750	0.797	0.842
21	Alabama	0.901	0.843	0.836	0.839	0.855
22	Maryland	0.801	0.723	1.070	0.848	0.861
23	Connecticut	0.847	0.883	0.847	0.877	0.863
24	Alaska	1.187	1.198	0.127	1.016	0.882
25	Louisiana	0.712	0.670	1.417	0.754	0.888
26	Texas	0.892	0.982	0.909	0.873	0.914
27	Oregon	0.879	0.910	1.023	0.993	0.951
28	California	0.912	0.998	1.161	0.924	0.999
	Avg for all states	1.000	1.000	1.000	1.000	1.000
29	Maine	0.911	1.041	1.016	1.067	1.009
30	Virginia	0.997	0.935	1.114	1.048	1.023
31	Arizona	1.142	0.996	1.035	1.010	1.046
32	New Jersey	1.025	0.954	1.148	1.059	1.047
33	**Georgia**	**1.002**	**1.005**	**1.187**	**1.113**	**1.077**
34	Michigan	1.198	1.030	1.012	1.124	1.091
35	Wyoming	1.018	1.423	0.784	1.157	1.096
36	Kansas	1.224	1.147	1.166	1.183	1.180
37	Mass	1.166	1.182	1.229	1.195	1.193
38	New Hamp	1.395	1.178	1.034	1.266	1.218
39	Nebraska	1.220	1.184	1.284	1.201	1.222
40	Tennessee	1.054	0.984	1.773	1.135	1.237
41	South Dakota	1.152	1.230	1.444	1.266	1.273
42	Illinois	1.787	1.549	0.839	1.461	1.409
43	Oklahoma	1.338	1.361	1.671	1.441	1.453
44	North Dakota	1.646	1.366	1.512	1.386	1.478
45	Ohio	1.764	1.626	1.478	1.342	1.553
46	Montana	1.987	1.985	0.818	1.866	1.664
47	Vermont	1.793	1.403	1.932	1.593	1.680
48	New York	1.517	1.455	2.410	1.615	1.749
49	Missouri	2.138	2.272	1.619	2.076	2.026

Mean index is constructed as the unweighted mean of the indexed values of the federal range ratio, coefficient of variation, inverted McLoone index and Gini coefficient.

distributions of resources.[8] Table 6 displays the results, with states ranked from most to least equitable.

For both the adjusted and unadjusted results, 28 states are at or below the national average while 21 states are above the average. West Virginia has the most equitable distribution in both lists, while Missouri has the least equitable distribution in both. While most states' results are relatively insensitive to the inclusion of cost-adjustments, the indexed values and rankings of several states change substantially. For example, Texas's ranking falls from fifth (index of 0.63) to 26th (index of 0.91) when the cost adjustments are included. Conversely, Florida's ranking rises from 9th for the unadjusted data (index of 0.71) to 2nd (index of 0.52) for the adjusted data. These results are particularly interesting since both states' funding formulas include an explicit adjustment for differential district costs. The results in Table 5 suggest that while Florida's formula helps to alleviate cost-based funding differentials, Texas's efforts may exacerbate such differences. Other states with cost adjustments in their state formulas (for example, Ohio, Virginia, and Alaska) generally appear more equitable in the analyses using cost-adjusted data.

Table 6 displays each state's ranking for each equity measure as well as for the mean index. As the table indicates, the rankings are relatively consistent, with most states achieving similar rankings on all measures. Rank correlation coefficients (Spearman's rho) across all measures are large and significant ($p < .01$), with most above 0.8. Both the table and the correlation coefficients suggest, though, that the values for the McLoone index tend to diverge somewhat from the results of the other measures.[9] The most striking example may be Alaska,

[8] Since higher values of the McLoone index indicate greater equity, the normed value is based on the value of (1-McLoone index). Therefore, as with the other measures, a lower value indicates greater equity.

[9] The rank correlation coefficients for the adjusted and unadjusted McLoone index with the other equity measures are generally between 0.4 and 0.6 ($p < .01$).

Table 6. Equity Measure Rankings by State

Equity Measure Rankings - Unadjusted Data

	Fed Range	Coefficient of Variation	McLoone Index	Gini Coefficient	Mean Rank
West Virginia	1	1	6	1	1
Kentucky	2	2	5	2	2
Iowa	3	4	9	3	3
Utah	5	17	1	9	4
Texas	4	13	7	7	5
Rhode Island	7	6	25	5	6
South Carolina	12	7	11	11	7
Wisconsin	9	8	15	10	8
Florida	6	3	32	4	9
Colorado	14	21	4	18	10
Idaho	10	15	10	21	11
New Mexico	18	14	20	6	12
Mississippi	16	12	13	17	13
Washington	8	10	30	12	14
Indiana	15	16	14	16	15
North Carolina	13	11	24	15	16
Arkansas	29	22	3	13	17
Delaware	23	5	34	8	18
Connecticut	19	19	18	19	19
Louisiana	11	9	42	14	20
Minnesota	20	20	17	24	21
California	17	27	19	22	22
Maryland	22	18	21	23	23
Nevada	25	33	8	20	24
Maine	21	30	16	29	25
Alaska	34	36	2	32	26
Arizona	28	31	22	28	27
Alabama	31	29	27	26	28
Oregon	26	23	35	30	29
Pennsylvania	30	25	31	31	30
Kansas	32	24	40	25	31
New Jersey	33	28	38	33	32
Nebraska	35	26	41	27	33
Wyoming	24	45	26	36	34
South Dakota	27	32	39	35	35
North Dakota	36	35	36	34	36
New York	40	43	12	41	37
New Hampshire	41	37	28	37	38
Virginia	37	41	29	44	39
Georgia	**43**	**38**	**33**	**40**	**40**
Mass	39	39	43	38	41
Oklahoma	42	42	37	42	42
Tennessee	38	34	48	39	43
Michigan	44	40	44	43	44
Montana	45	47	23	47	45
Vermont	46	44	47	46	46
Ohio	47	46	45	45	47
Illinois	48	48	49	48	48
Missouri	49	49	46	49	49

Equity Measure Rankings - Cost Adjusted Data

	Fed Range	Coefficient of Variation	McLoone Index	Gini Coefficient	Mean Rank
West Virginia	1	2	5	1	1
Florida	2	3	7	2	2
Kentucky	3	1	15	3	3
Wisconsin	10	6	8	5	4
Utah	5	19	3	13	5
North Carolina	6	7	14	7	6
Colorado	4	26	4	15	7
Delaware	26	4	6	4	8
South Carolina	8	5	27	6	9
Iowa	13	13	9	11	10
Washington	7	14	16	8	11
Rhode Island	9	8	26	9	12
Mississippi	11	10	19	16	13
Indiana	12	12	24	14	14
Nevada	16	34	2	18	15
Pennsylvania	20	15	11	22	16
New Mexico	28	22	10	10	17
Idaho	18	16	12	25	18
Minnesota	14	17	23	20	19
Arkansas	27	20	13	17	20
Alabama	23	18	20	19	21
Maryland	17	11	33	21	22
Connecticut	19	21	22	24	23
Alaska	37	39	1	29	24
Louisiana	15	9	41	12	25
Texas	22	27	25	23	26
Oregon	21	23	30	27	27
California	25	30	36	26	28
Maine	24	33	29	32	29
Virginia	29	24	34	30	30
Arizona	34	29	32	28	31
New Jersey	32	25	35	31	32
Georgia	**30**	**31**	**38**	**33**	**33**
Michigan	38	32	28	34	34
Wyoming	31	44	17	36	35
Kansas	40	35	37	37	36
Mass	36	37	39	38	37
New Hamp	42	36	31	41	38
Nebraska	39	38	40	39	39
Tennessee	33	28	47	35	40
South Dakota	35	40	42	40	41
Illinois	47	46	21	45	42
Oklahoma	41	41	46	44	43
North Dakota	44	42	44	43	44
Ohio	45	47	43	42	45
Montana	48	48	18	48	46
Vermont	46	43	48	46	47
New York	43	45	49	47	48
Missouri	49	49	45	49	49

which ranks no better than 24th for the federal range ratio, coefficient of variation or Gini coefficient, but ranks first or second for the McLoone index. A single very large district with spending close to the median is the most likely cause of such a pattern. The result points out a potential pitfall from relying on a single measure to capture the dispersion of resources within a state.

Table 5 shows that the horizontal equity of Georgia's revenue distribution ranks well below the national average. Using the unadjusted data, Georgia ranks 40th of the 49 states, while inclusion of the cost-adjustments improves its position to 33rd. Georgia's mean index is 1.22 for the unadjusted data, indicating that its values for the equity measures are 22 percent higher (worse) than the national average. Using the cost adjusted data substantially improves Georgia's index to 1.08, reflecting values closer to, but still above, the national mean. Georgia's results are very consistent across measures, with the state ranking no better than 30th on any individual measure (adjusted federal range ratio).

IV. Implications and Conclusions

This research examines the equity of the intrastate distribution of revenues for 49 states using NCES data for the 1991-92 school year, with close attention given to the distribution for Georgia. Major findings of the study suggest that:

- While the cost adjustments do not substantially change the equity measures in most states, the results of several states -- including Georgia -- are particularly sensitive to the adjustment methodology. Most states (with the notable exception of Texas) in which a geographic cost adjustment is included in the state funding formula appear more equitable when cost-adjusted data are used.

- Northeastern and Midwestern states appear to have greater revenue disparities than states in the South and West. Georgia, however, tends to have greater revenue disparities than most Southern and Western states.

- While Southern states tend to have more equitable distributions of revenues than states in other regions, as well as lower revenues, there appears to be little relationship overall between spending levels and equity. Georgia, however, is one Southern state with lower than average revenues and relatively large revenue disparities.

- States with the largest number of school districts (above 460) tend to have greater revenue disparities than states with fewer districts, although the size of a state's pupil membership appears to have little relationship with equity. Georgia, however, appears to slightly deviate from this trend. Ranked 24th in number of districts and 9th in the number of students, Georgia tends to have greater revenue disparities than states with a larger number of school districts.

Several caveats to the conclusions above must be noted. First, these data present a "snapshot" of equity using only one year of data. To the extent that this year (1991-92) is not typical for any state, the analyses may present misleading results. Longitudinal analyses of horizontal and vertical equity in Georgia (Rubenstein, Doering, Gess, 1999) suggest that the distribution of revenues may have been particularly inequitable in 1992, a year that Georgia was in the midst of a recession. More recent data indicate that equity has improved somewhat since that time.

Second, the data are from 1992 and a number of states have changed their education funding systems since that time. Therefore, the data presented here may not accurately portray the current status of equity in those states. For example, Georgia has increased the state share of revenues since 1992 and equity has improved. Other states have enacted major revisions to their funding programs. No more recent finance data for the population of U.S. school districts are available to conduct more timely analyses, however.[10]

[10] The methodology and analyses presented here may be viewed as a first step in the longitudinal analysis of equity across the United States, to be completed when new data become available.

Third, while these analyses adjust for cost of education differences across districts, they do not account for differences in student characteristics and needs. Since Georgia's QBE funding system includes student weights that provide additional funding to students in lower grades, and to those in special education and gifted programs, some resource disparities may be due to policy decisions to target extra funding to districts serving these students.

Despite these shortcomings of the data, a number of conclusions can be drawn about the equity of public education funding in Georgia. For most measures, using both cost-adjusted and unadjusted data, Georgia appears to have a less equitable distribution of resources than most other states. The results are particularly striking using the unadjusted data, with Georgia ranking 40th out of 49 states in the analysis. Even when compared to states with comparable spending levels and number of districts, and compared to other Southern states, Georgia ranks poorly relative to its peers. Perhaps most troubling is that the inequity is combined with a relatively low level of funding. Georgia's median cost-adjusted spending level of $4,451 per pupil ranks 32nd out of the 49 states (35th using the unadjusted data). While efforts have been made to increase education spending and, specifically, to raise teacher salaries to the national average, funding remains below national averages.[11]

A number of other states with lower funding levels or more inequitable distributions of revenues have been involved in litigation over their state funding systems. Georgia's most recent

[11] In 1995-96, Georgia's current expenditures per-pupil (unadjusted for cost differences) ranked 34th out the same 49 states. (U.S. Department of Education, National Center for Education Statistics, Table 168, 1998).

legal challenge (*McDaniel v. Thomas*) was decided in the early 1980s, with the court ruling against plaintiffs challenging Georgia's funding program. The results of these analyses and the experiences of other states suggest that, if future legal challenges were to occur, the outcome might be difficult to predict. The results also point out the importance of continuously monitoring the equity and adequacy of public education funding in Georgia to ensure that all students have the opportunity to achieve at the high level demanded by policy makers and taxpayers.

References

Robert Berne, Michele Moser, and Leanna Stiefel. (1998) "Equity and Efficiency in Public Elementary and Secondary Education: 30 Years of History," *Research in Public Policy Analysis and Management,* (New York, NY: JAI Press).

Robert Berne and Leanna Stiefel, *The Measurement of Equity in School Finance*, (Baltimore, MD: John Hopkins University Press, 1984).

Jay G. Chambers, "Public School Teacher Cost Differences Across the United States: Introduction to a Teacher Cost Index (TCI)" in *Developments in School Finance 1995*, ed. William J. Fowler, Jr. (Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, 1996).

Walter W. McMahon "Intrastate Cost Adjustments." In *Selected Papers in School Finance 1994*, ed. William J. Fowler, Jr. (Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, 1996).

Wallace E. Oates, *Fiscal Federalism*, (New York: Harcourt Brace) 1972.

Allan R. Odden and Lawrence O. Picus, *School Finance: A Policy Perspective* (New York: McGraw-Hill, (1992), 66-70.

Ross Rubenstein, Dwight R. Doering and Larry R. Gess, *The Equity of Public Education Funding in Georgia, 1988-1996* (Atlanta: Fiscal Research Program, School of Policy Studies, Georgia State University, 1998).

Ross Rubenstein, Dwight R. Doering, and Larry R. Gess. (forthcoming, 1999). "The Equity of Public Education Funding in Georgia, 1988-96," *Journal of Education Finance*.

U.S. Department of Education, National Center for Education Statistics. *Digest of Education Statistics, 1997* (Washington, DC: National Center for Education Statistics, 1998).

Appendix

About the Data

All revenue, expenditure and enrollment data used in the study come from the Common Core of Data (CCD), produced by the National Center for Education Statistics (NCES). The CCD data are for the 1991-92 school year, the most recent year for which data were collected from the population of school districts in the United States. The analyses compare the dispersion of combined state and local revenues for Georgia with the dispersion for all states, with the exception of Hawaii. Federal revenues, because they are outside the control of state and local policy makers, are excluded from the analyses. All calculations are weighted by the number of pupils in each district. Thus, very small districts have less influence on the results than do large districts.

While the analyses focus on revenues, expenditure data were used to calculate the proportion of total spending devoted to various objects of expenditure, such as teacher and administrator salaries and benefits, non-certified personnel salary and benefits, and non-personnel resources. Since Chambers's TCI estimates cost differences across districts associated with teachers and other certified personnel, the TCI for each district was applied to the portion of total revenues primarily devoted to certified personnel expenditures. McMahon's COL measures broader differences in the cost of living across districts and these differences are likely to be reflected in the salaries for non-certified personnel, as well as non-personnel resources (such as instructional materials and media, food service, and student transportation). Therefore, the COL was applied to the remainder of district revenues to account for differences in these portions of total district costs.

To account for "exogenous" costs, the data were adjusted using a "hybrid" of the cost indices created by Jay Chambers and Walter McMahon. Chambers's Teacher Cost Index (TCI) uses a hedonic wage model to estimate teacher salary differences across districts while controlling for factors outside local districts' control, including amenities that make teaching positions relatively more or less attractive. McMahon's Cost of Living index (COL) more broadly estimates cost of living differences across districts based on factors such as housing costs, per capita income, and population density. An updated Cost of Education Index is forthcoming from Chambers but was not available for this study.

A drawback to this analysis is that both Chambers' TCI and McMahon's COL are used despite some data limitations. Each of the indices does not include values for all of the districts in the United States. Therefore, where no value exists in the COL for a district, the researchers add the value from the TCI for that district to the difference between the state average values for the TCI and the COL. In a similar manner, where no value exists in Chambers' TCI for a district, the researchers subtract the value from the COL for that district from the difference between the state average values for the TCI and the COL.

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